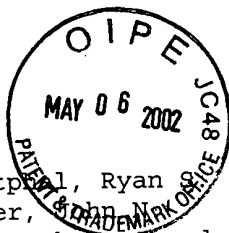


#5



SEQUENCE LISTING

<110> Westphal, Ryan S.
Feder, John N.
Ramanathan, Chandra S.
Mintier, Gabriel A.

<120> NUCLEIC ACID MOLECULES AND POLYPEPTIDES FOR A HUMAN CATION CHANNEL POLYPEPTIDE

<130> D0187NP
<140> 10/029,677
<141> 2001-12-21

<150> US 60/257,865
<151> 2000-12-21

<160> 24

<170> PatentIn version 3.0

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<222> (20)..(2011)

<220>
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Pro Ala Asn Asn His Asn His His Ala Pro Pro Ala Ile Lys Ala Asn		
15 20 25		
ggc aaa gat gac cac agg aca agc agc agg cca cac tct gca gct gac		148
Gly Lys Asp Asp His Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp		
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gat gac acc tcc tca gaa ctg cag agg ctg gca gac gtg gat gcc cca		196
Asp Asp Thr Ser Ser Glu Leu Gln Arg Leu Ala Asp Val Asp Ala Pro		
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Gln Gln Gly Arg Ser Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile		
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Ile Arg Glu Trp Ala Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro	
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gac tca ttc ctc gag cgt ttt cgt ggg cct gaa ctc cag act gtg acc	340
Asp Ser Phe Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr	
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aca cag gag ggg gat ggc aaa ggc gac aag gat ggc gag gac aaa ggc	388
Thr Gln Glu Gly Asp Gly Lys Gly Asp Lys Asp Gly Glu Asp Lys Gly	
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Thr Lys Lys Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu	
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Tyr Tyr Cys Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp	
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tgc ctg ctg gtg gcc aga gcc tgc ttc agt gac cta cag aaa ggc tac	532
Cys Leu Leu Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr	
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Tyr Leu Val Trp Leu Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile	
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Ala Asp Leu Phe Ile Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu	
190 195 200	
ctg gtc aaa gat acc aag aaa ctg cga gac aac tac atc cac acc ctg	676
Leu Val Lys Asp Thr Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu	
205 210 215	
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Phe Ala Val Asp Ile His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu	
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Asn Tyr Pro Asn Ile Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu	
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gtc atc atc cac tgg aat gcc tgc atc tat tat gcc atc tcc aaa tcc	916
Val Ile Ile His Trp Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser	
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ata ggc ttt ggg gtc gac acc tgg gtt tac cca aac atc act gac cct	964

Ile Gly Phe Gly Val Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro	
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320 325 330	
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Phe Ala Thr Ile Val Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn	
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gcc acc cgg gca gag ttc cag gct aag atc gat gcc gtg aaa cac tac	1204
Ala Thr Arg Ala Glu Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr	
380 385 390 395	
atg cag ttc cga aag gtc agc aag ggg atg gaa gcc aag gtc att agg	1252
Met Gln Phe Arg Lys Val Ser Lys Gly Met Glu Ala Lys Val Ile Arg	
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Trp Phe Asp Tyr Leu Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu	
415 420 425	
att ctc aag aat ctg cca gcc aag ctc agg gct gag ata gcc acc aat	1348
Ile Leu Lys Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Thr Asn	
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Val His Leu Ser Thr Leu Lys Lys Val Arg Ile Phe His Asp Cys Glu	
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gct ggc ctg ctg gta gag ctg gta ctg aaa ctc cgt cct cag gtc ttc	1444
Ala Gly Leu Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe	
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Ser Pro Gly Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met	
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Tyr Ile Ile Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val	
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act cag tat gct ctg ctg tcg gct gga agc tgc ttt ggc gag atc agt	1588
Thr Gln Tyr Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser	
510 515 520	
atc ctt aac att aag ggc agt aaa atg ggc aat cga cgc aca gct aat	1636
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Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp Asp Asp Thr Ser Ser
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Glu Leu Gln Arg Leu Ala Asp Val Asp Ala Pro Gln Gln Gly Arg Ser
50 55 60

Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile Ile Arg Glu Trp Ala
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Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro Asp Ser Phe Leu Glu
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Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Thr Gln Glu Gly Asp
100 105 110

Gly Lys Gly Asp Lys Asp Gly Glu Asp Lys Gly Thr Lys Lys Lys Phe
115 120 125

Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu Tyr Tyr Cys Trp Leu
130 135 140

Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys Leu Leu Val Ala
145 150 155 160

Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr Tyr Leu Val Trp Leu
165 170 175

Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile Ala Asp Leu Phe Ile
180 185 190

Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys Asp Thr
195 200 205

Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu Gln Phe Lys Leu Asp
210 215 220

Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe Ala Val Asp Ile
225 230 235 240

His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu His Phe Ala Arg Met
245 250 255

Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Asn Tyr Pro Asn Ile

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265

270

Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu Val Ile Ile His Trp
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Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser Ile Gly Phe Gly Val
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Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr Leu Thr Leu Thr
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Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp Glu Glu Tyr Leu Phe
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Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe Ala Thr Ile Val
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Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala Thr Arg Ala Glu
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 385 390 395 400

Val Ser Lys Gly Met Glu Ala Lys Val Ile Arg Trp Phe Asp Tyr Leu
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Pro Ala Lys Leu Arg Ala Glu Ile Ala Thr Asn Val His Leu Ser Thr
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Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu Arg Gly Arg Glu
565 570 575

Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala Thr Ser
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595 600 605

Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu Ala Glu Tyr Thr Gly
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Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr Lys Met
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Gln Cys Glu Thr Arg Arg Arg Ala Gln Thr Pro Cys Glu Ser Thr Gly
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His Thr Trp Arg Met Thr Glu Lys Ser Asn Gly Val Lys Ser Ser Pro
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Ala Asn Asn His Asn Asn His Val Pro Ala Thr Ile Lys Ala Asn Gly
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Lys Asp Glu Ser Arg Thr Arg Ser Arg Pro Gln Ser Ala Ala Asp Asp
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Asp Thr Ser Ser Glu Leu Gln Arg Leu Ala Glu Met Asp Ala Pro Gln
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Gln Arg Arg Gly Gly Phe Arg Arg Ile Val Arg Leu Val Gly Val Ile
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Arg Gln Trp Ala Asn Arg Asn Phe Arg Glu Glu Ala Arg Pro Asp
145 150 155 160

Ser Phe Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Thr

165

170

175

Gln Gln Gly Asp Gly Lys Gly Asp Lys Asp Gly Asp Gly Lys Gly Thr
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Lys Lys Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Trp Tyr
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Tyr Arg Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys
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Leu Leu Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Arg Gly Tyr Phe
225 230 235 240

Leu Val Trp Leu Val Leu Asp Tyr Phe Ser Asp Val Val Tyr Ile Ala
245 250 255

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260 265 270

Val Lys Asp Pro Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu Gln
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Phe Lys Leu Asp Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe
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Ala Val Gly Ile His Asn Pro Glu Leu Arg Phe Asn Arg Leu Leu His
305 310 315 320

Phe Ala Arg Met Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Ser
325 330 335

Tyr Pro Asn Ile Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu Val
340 345 350

Ile Ile His Trp Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser Ile
355 360 365

Gly Phe Gly Val Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro Glu
370 375 380

Tyr Gly Tyr Leu Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr
385 390 395 400

Leu Thr Leu Thr Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp Glu
405 410 415

Glu Tyr Leu Phe Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe
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Ala Thr Ile Val Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala
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Thr Arg Ala Glu Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr Met
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Gln Phe Arg Lys Val Ser Lys Glu Met Glu Ala Lys Val Ile Lys Trp

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Leu Lys Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn Val						
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His Leu Ser Thr Leu Lys Lys Val Arg Ile Phe Gln Asp Cys Glu Ala						
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Gly Leu Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser						
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Pro Gly Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr						
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Ile Ile Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr						
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Gln Tyr Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile						
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Leu Asn Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn Ile						
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Arg Ser Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu						
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Met Glu Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu						
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Arg Gly Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu						
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Val Ala Ala Ser Met Glu Val Asp Val Gln Glu Lys Leu Lys Gln Leu						
	660			665		670
Glu Thr Asn Met Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu Ala						
	675			680		685
Glu Tyr Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu						
	690			695		700
Glu Val Lys Met Lys Gln Asn Thr Glu Asp Asp Tyr Leu Ser Asp Gly						
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Met Asn Ser Pro Glu Pro Ala Ala Ala Glu Gln Pro						
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 <213> Bos taurus

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 Glu Leu Gln Gln Leu Ala Glu Met Asp Ala Pro Gln Gln Arg Arg Gly
 50 55 60
 Gly Phe Arg Arg Ile Ala Arg Leu Val Gly Val Leu Arg Glu Trp Ala
 65 70 75 80
 Tyr Arg Asn Phe Arg Glu Glu Glu Pro Arg Pro Asp Ser Phe Leu Glu
 85 90 95
 Arg Phe Arg Gly Pro Glu Leu His Thr Val Thr Thr Gln Gln Gly Asp
 100 105 110
 Gly Lys Gly Asp Lys Asp Gly Glu Gly Lys Gly Thr Lys Lys Lys Phe
 115 120 125
 Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Trp Tyr Tyr Arg Trp Leu
 130 135 140
 Phe Leu Ile Ala Leu Pro Val Leu Tyr Asn Trp Cys Leu Leu Val Ala
 145 150 155 160
 Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr Tyr Ile Val Trp Leu
 165 170 175
 Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile Ala Asp Leu Phe Ile
 180 185 190
 Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys Asp Thr
 195 200 205
 Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Met Gln Phe Lys Leu Asp
 210 215 220
 Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe Ala Val Gly Ile
 225 230 235 240
 His Asn Pro Glu Val Arg Phe Asn Arg Leu Leu His Phe Ala Arg Met
 245 250 255
 Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Ser Tyr Pro Asn Ile
 260 265 270
 Phe Arg Ile Ser Asn Leu Ile Leu Tyr Ile Leu Ile Ile Ile His Trp
 275 280 285
 Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser Ile Gly Phe Gly Val
 290 295 300

Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro Glu Tyr Gly Tyr Leu	305	310	315	320
Ser Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr Leu Thr Leu Thr	325	330	335	
Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp Glu Glu Tyr Leu Phe	340	345	350	
Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe Ala Thr Ile Val	355	360	365	
Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala Thr Arg Ala Glu	370	375	380	
Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr Met Gln Phe Arg Lys	385	390	395	400
Val Ser Lys Glu Met Glu Ala Lys Val Ile Arg Trp Phe Asp Tyr Leu	405	410	415	
Trp Thr Asn Lys Lys Ser Val Asp Glu Arg Glu Val Leu Lys Asn Leu	420	425	430	
Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn Val His Leu Ser Thr	435	440	445	
Leu Lys Lys Val Arg Ile Phe Gln Asp Cys Glu Ala Gly Leu Leu Val	450	455	460	
Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser Pro Gly Asp Tyr	465	470	475	480
Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr Ile Ile Lys Glu	485	490	495	
Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr Gln Tyr Ala Leu	500	505	510	
Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile Leu Asn Ile Lys	515	520	525	
Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn Ile Arg Ser Leu Gly	530	535	540	
Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu Met Glu Ala Val	545	550	555	560
Thr Glu Tyr Pro Asp Ala Lys Arg Val Leu Glu Glu Arg Gly Arg Glu	565	570	575	
Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala Ala Ser	580	585	590	
Met Glu Val Asp Val Gln Glu Lys Leu Glu Gln Leu Glu Thr Asn Met	595	600	605	

Asp Thr Leu Tyr Thr Arg Phe Ala Arg Leu Leu Ala Glu Tyr Thr Gly
610 615 620

Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr Lys Met
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Glu Pro Pro Ala Glu Lys Pro
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<212> PRT
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<400> 17

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His Arg Ala Gly Ser Arg Pro Gln Ser Val Ala Ala Asp Asp Asp Thr
35 40 45

Ser Ser Glu Leu Gln Arg Leu Ala Glu Met Asp Thr Pro Arg Arg Gly
50 55 60

Arg Gly Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile Ile Arg Asp
65 70 75 80

Trp Ala Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro Asp Ser Phe
85 90 95

Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Pro His Gln
100 105 110

Gly Asp Gly Lys Gly Asp Lys Asp Gly Glu Gly Lys Gly Thr Lys Lys
115 120 125

Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Trp Tyr Tyr Arg
130 135 140

Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys Leu Leu
145 150 155 160

Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Arg Asn Tyr Phe Val Val
165 170 175

Trp Leu Val Leu Asp Tyr Phe Ser Asp Thr Val Tyr Ile Ala Asp Leu
180 185 190

Ile Ile Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys
195 200 205

Asp	Pro	Lys	Lys	Leu	Arg	Asp	Asn	Tyr	Ile	His	Thr	Leu	Gln	Phe	Lys	210	215	220	
Leu	Asp	Val	Ala	Ser	Ile	Ile	Pro	Thr	Asp	Leu	Ile	Tyr	Phe	Ala	Val	225	230	235	240
Gly	Ile	His	Ser	Pro	Glu	Val	Arg	Phe	Asn	Arg	Leu	Leu	His	Phe	Ala	245	250	255	
Arg	Met	Phe	Glu	Phe	Phe	Asp	Arg	Thr	Glu	Thr	Arg	Thr	Ser	Tyr	Pro	260	265	270	
Asn	Ile	Phe	Arg	Ile	Ser	Asn	Leu	Val	Leu	Tyr	Ile	Leu	Val	Ile	Ile	275	280	285	
His	Trp	Asn	Ala	Cys	Ile	Tyr	Tyr	Ala	Ile	Ser	Lys	Ser	Ile	Gly	Phe	290	295	300	
Gly	Val	Asp	Thr	Trp	Val	Tyr	Pro	Asn	Ile	Thr	Asp	Pro	Glu	Tyr	Gly	305	310	315	320
Tyr	Leu	Ala	Arg	Glu	Tyr	Ile	Tyr	Cys	Leu	Tyr	Trp	Ser	Thr	Leu	Thr	325	330	335	
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Ala	Glu	Phe	Gln	Ala	Lys	Ile	Asp	Ala	Val	Lys	His	Tyr	Met	Gln	Phe	385	390	395	400
Arg	Lys	Val	Ser	Lys	Asp	Met	Glu	Ala	Lys	Val	Ile	Lys	Trp	Phe	Asp	405	410	415	
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Asn	Leu	Pro	Ala	Lys	Leu	Arg	Ala	Glu	Ile	Ala	Ile	Asn	Val	His	Leu	435	440	445	
Ser	Thr	Leu	Lys	Lys	Val	Arg	Ile	Phe	Gln	Asp	Cys	Glu	Ala	Gly	Leu	450	455	460	
Leu	Val	Glu	Leu	Val	Leu	Lys	Leu	Arg	Pro	Gln	Val	Phe	Ser	Pro	Gly	465	470	475	480
Asp	Tyr	Ile	Cys	Arg	Lys	Gly	Asp	Ile	Gly	Lys	Glu	Met	Tyr	Ile	Ile	485	490	495	
Lys	Glu	Gly	Lys	Leu	Ala	Val	Val	Ala	Asp	Asp	Gly	Val	Thr	Gln	Tyr	500	505	510	

Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile Leu Asn
515 520 525

Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Gly Thr Ile Arg Ser
530 535 540

Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu Met Glu
545 550 555 560

Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu Arg Gly
565 570 575

Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala
580 585 590

Ala Ser Met Glu Val Asp Val Gln Glu Lys Leu Glu Gln Leu Glu Thr
595 600 605

Asn Met Glu Thr Leu Tyr Thr Arg Phe Ala Arg Leu Leu Ala Glu Tyr
610 615 620

Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr
625 630 635 640

Lys Met Lys Gln Asn His Glu Asp Asp Tyr Leu Ser Asp Gly Ile Asn
645 650 655

Thr Pro Glu Pro Ala Val Ala Glu
660

<210> 18
<211> 664
<212> PRT
<213> Rattus norvegicus

<400> 18

Met Met Thr Glu Lys Ser Asn Gly Val Lys Ser Ser Pro Ala Asn Asn
1 5 10 15

His Asn His His Pro Pro Pro Ser Ile Lys Ala Asn Gly Lys Asp Asp
20 25 30

His Arg Ala Gly Ser Arg Pro Gln Ser Val Ala Ala Asp Asp Asp Thr
35 40 45

Ser Pro Glu Leu Gln Arg Leu Ala Glu Met Asp Thr Pro Arg Arg Gly
50 55 60

Arg Gly Gly Phe Gln Arg Ile Val Arg Leu Val Gly Val Ile Arg Asp
65 70 75 80

Trp Ala Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro Asp Ser Phe
85 90 95

Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Thr His Gln

100					105					110					
Gly	Asp	Asp	Lys	Gly	Gly	Lys	Asp	Gly	Glu	Gly	Lys	Gly	Thr	Lys	Lys
	115						120					125			
Lys	Phe	Glu	Leu	Phe	Val	Leu	Asp	Pro	Ala	Gly	Asp	Trp	Tyr	Tyr	Arg
	130					135					140				
Trp	Leu	Phe	Val	Ile	Ala	Met	Pro	Val	Leu	Tyr	Asn	Trp	Cys	Leu	Leu
145					150					155					160
Val	Ala	Arg	Ala	Cys	Phe	Ser	Asp	Leu	Gln	Arg	Asn	Tyr	Phe	Val	Val
				165					170					175	
Trp	Leu	Val	Leu	Asp	Tyr	Phe	Ser	Asp	Thr	Val	Tyr	Ile	Ala	Asp	Leu
			180					185					190		
Ile	Ile	Arg	Leu	Arg	Thr	Gly	Phe	Leu	Glu	Gln	Gly	Leu	Leu	Val	Lys
		195					200					205			
Asp	Pro	Lys	Lys	Leu	Arg	Asp	Asn	Tyr	Ile	His	Thr	Leu	Gln	Phe	Lys
	210					215					220				
Leu	Asp	Val	Ala	Ser	Ile	Ile	Pro	Thr	Asp	Leu	Ile	Tyr	Phe	Ala	Val
225					230					235					240
Gly	Ile	His	Ser	Pro	Glu	Val	Arg	Phe	Asn	Arg	Leu	Leu	His	Phe	Ala
				245					250					255	
Arg	Met	Phe	Glu	Phe	Phe	Asp	Arg	Thr	Glu	Thr	Arg	Thr	Ser	Tyr	Pro
			260					265					270		
Asn	Ile	Phe	Arg	Ile	Ser	Asn	Leu	Val	Leu	Tyr	Ile	Leu	Val	Ile	Ile
		275					280					285			
His	Trp	Asn	Ala	Cys	Ile	Tyr	Tyr	Val	Ile	Ser	Lys	Ser	Ile	Gly	Phe
	290					295					300				
Gly	Val	Asp	Thr	Trp	Val	Tyr	Pro	Asn	Ile	Thr	Asp	Pro	Glu	Tyr	Gly
305					310					315					320
Tyr	Leu	Ala	Arg	Glu	Tyr	Ile	Tyr	Cys	Leu	Tyr	Trp	Ser	Thr	Leu	Thr
				325					330					335	
Leu	Thr	Thr	Ile	Gly	Glu	Thr	Pro	Pro	Pro	Val	Lys	Asp	Glu	Glu	Tyr
			340					345					350		
Leu	Phe	Val	Ile	Phe	Asp	Phe	Leu	Ile	Gly	Val	Leu	Ile	Phe	Ala	Thr
	355						360					365			
Ile	Val	Gly	Asn	Val	Gly	Ser	Met	Ile	Ser	Asn	Met	Asn	Ala	Thr	Arg
	370					375					380				
Ala	Glu	Phe	Gln	Ala	Lys	Ile	Asp	Ala	Val	Lys	His	Tyr	Met	Gln	Phe
385					390					395					400
Arg	Lys	Val	Ser	Lys	Asp	Met	Glu	Ala	Lys	Val	Ile	Lys	Trp	Phe	Asp

405	410	415
Tyr Leu Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu Val Leu Lys 420 425 430		
Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn Val His Leu 435 440 445		
Ser Thr Leu Lys Lys Val Arg Ile Phe Gln Asp Cys Glu Ala Gly Leu 450 455 460		
Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser Pro Gly 465 470 475 480		
Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr Ile Ile 485 490 495		
Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr Gln Tyr 500 505 510		
Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile Leu Asn 515 520 525		
Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn Ile Arg Ser 530 535 540		
Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu Met Glu 545 550 555 560		
Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu Arg Gly 565 570 575		
Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala 580 585 590		
Ala Ser Met Glu Val Asp Val Gln Glu Lys Leu Glu Gln Leu Glu Thr 595 600 605		
Asn Met Asp Thr Leu Tyr Thr Arg Phe Ala Arg Leu Leu Ala Glu Tyr 610 615 620		
Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr 625 630 635 640		
Lys Met Lys Gln Asn His Glu Asp Asp Tyr Leu Ser Asp Gly Ile Asn 645 650 655		
Thr Pro Glu Pro Thr Ala Ala Glu 660		

<210> 19
 <211> 39
 <212> DNA
 <213> Homo sapiens

<400> 19
 gcagcagcgg ccgctactac tgctggctat ttgtcattg

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<210> 20
<211> 36
<212> DNA
<213> Homo sapiens
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<210> 21
<211> 38
<212> DNA
<213> Homo sapiens
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<210> 22
<211> 36
<212> DNA
<213> Homo sapiens
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<210> 23
<211> 2190
<212> DNA
<213> Homo sapiens
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<400> 23
ctctagatgt acatggagg atg acc gaa aaa acc aat ggt gtg aag agc tcc      52
           Met Thr Glu Lys Thr Asn Gly Val Lys Ser Ser
           1               5               10

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ggc aaa gat gac cac agg aca agc agc agg cca cac tct gca gct gac 148
Gly Lys Asp Asp His Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp
30 35 40

cag cag gga agg agt ggc ttc cgc agg ata gtt cgc ctg gtg ggg atc 244
Gln Gln Gly Arg Ser Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile

60	65	70	75	
atc aga gaa tgg gcc aac aag aat ttc cga gag gag gaa cct agg cct Ile Arg Glu Trp Ala Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro	80	85	90	292
gac tca ttc ctc gag cgt ttt cgt ggg cct gaa ctc cag act gtg acc Asp Ser Phe Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr	95	100	105	340
aca cag gag ggg gat ggc aaa ggc gac aag gat ggc gag gac aaa ggc Thr Gln Glu Gly Asp Gly Lys Gly Asp Lys Asp Gly Glu Asp Lys Gly	110	115	120	388
acc aag aag aaa ttt gaa cta ttt gtc ttg gac cca gct ggg gat ttg Thr Lys Lys Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu	125	130	135	436
tac tac tgc tgg cta ttt gtc att gcc atg ccc gtc ctt tac aac tgg Tyr Tyr Cys Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp	140	145	150	484
tgc ctg ctg gtg gcc aga gcc tgc ttc agt gac cta cag aaa ggc tac Cys Leu Leu Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr	160	165	170	532
tac ctg gtg tgg ctg gtg ctg gat tat gtc tca gat gtg gtc tac att Tyr Leu Val Trp Leu Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile	175	180	185	580
gcg gac ctc ttc atc cga ttg cgc aca ggt ttc ctg gag cag ggg ctg Ala Asp Leu Phe Ile Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu	190	195	200	628
ctg gtc aaa gat acc aag aaa ctg cga gac aac tac atc cac acc ctg Leu Val Lys Asp Thr Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu	205	210	215	676
cag ttc aag ctg gat gtg gct tcc atc atc ccc act gac ctg atc tat Gln Phe Lys Leu Asp Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr	220	225	230	724
ttt gct gtg gac atc cac agc cct gag gtg cgc ttc aac cgc ctg ctg Phe Ala Val Asp Ile His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu	240	245	250	772
cac ttt gcc cgc atg ttt gag ttc ttt gac cgg aca gag aca cgc acc His Phe Ala Arg Met Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr	255	260	265	820
aac tac cct aac atc ttc cgc atc agc aac ctt gtc ctc tac atc ttg Asn Tyr Pro Asn Ile Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu	270	275	280	868
gtc atc atc cac tgg aat gcc tgc atc tat tat gcc atc tcc aaa tcc Val Ile Ile His Trp Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser	285	290	295	916

ata ggc ttt ggg gtc gac acc tgg gtt tac cca aac atc act gac cct Ile Gly Phe Gly Val Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro 300 305 310 315	964
gag tat ggc tac ctg gct agg gaa tac atc tat tgc ctt tac tgg tcc Glu Tyr Gly Tyr Leu Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser 320 325 330	1012
aca ctg act ctc act acc att ggg gag aca cca ccc cct gta aag gat Thr Leu Thr Leu Thr Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp 335 340 345	1060
gag gag tac cta ttt gtc atc ttt gac ttc ctg att ggc gtc ctc atc Glu Glu Tyr Leu Phe Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile 350 355 360	1108
ttt gcc acc atc gtg gga aat gtg ggc tcc atg atc tcc aac atg aat Phe Ala Thr Ile Val Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn 365 370 375	1156
gcc acc cgg gca gag ttc cag gct aag atc gat gcc gtg aaa cac tac Ala Thr Arg Ala Glu Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr 380 385 390 395	1204
atg cag ttc cga aag gtc agc aag ggg atg gaa gcc aag gtc att agg Met Gln Phe Arg Lys Val Ser Lys Gly Met Glu Ala Lys Val Ile Arg 400 405 410	1252
tgg ttt gac tac ttg tgg acc aat aag aag aca gtg gat gag cga gaa Trp Phe Asp Tyr Leu Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu 415 420 425	1300
att ctc aag aat ctg cca gcc aag ctc agg gct gag ata gcc atc aat Ile Leu Lys Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn 430 435 440	1348
gtc cac ttg tcc aca ctc aag aaa gtg cgc atc ttc cat gat tgt gag Val His Leu Ser Thr Leu Lys Lys Val Arg Ile Phe His Asp Cys Glu 445 450 455	1396
gct ggc ctg ctg gta gag ctg gta ctg aaa ctc cgt cct cag gtc ttc Ala Gly Leu Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe 460 465 470 475	1444
agt cct ggg gat tac att tgc cgc aaa ggg gac atc ggc aag gag atg Ser Pro Gly Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met 480 485 490	1492
tac atc att aag gag ggc aaa ctg gca gtg gtg gct gat gat ggt gtg Tyr Ile Ile Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val 495 500 505	1540
act cag tat gct ctg ctg tcg gct gga agc tgc ttt ggc gag atc agt Thr Gln Tyr Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser 510 515 520	1588

atc ctt aac att aag ggc agt aaa atg ggc aat cga cgc aca gct aat	1636
Ile Leu Asn Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn	
525 530 535	

atc cgc agc ctg ggc tac tca gat ctc ttc tgc ttg tcc aag gat gat	1684
Ile Arg Ser Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp	
540 545 550 555	

ctt atg gaa gct gtg act gag tac cct gat gcc aag aaa gtc cta gaa	1732
Leu Met Glu Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu	
560 565 570	

gag agg ggt cgg gag atc ctc atg aag gag gga ctg ctg gat gag aac	1780
Glu Arg Gly Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn	
575 580 585	

gaa gtg gca acc agc atg gag gtc gac gtg cag gag aag cta ggg cag	1828
Glu Val Ala Thr Ser Met Glu Val Asp Val Gln Glu Lys Leu Gly Gln	
590 595 600	

ctg gag acc aac atg gaa acc ttg tac act cgc ttt ggc cgc ctg ctg	1876
Leu Glu Thr Asn Met Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu	
605 610 615	

gct gag tac acg ggg gcc cag cag aag ctc aag cag cgc atc aca gtt	1924
Ala Glu Tyr Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val	
620 625 630 635	

ctg gaa acc aag atg aaa cag aac aat gaa gat gac tac ctg tct gat	1972
Leu Glu Thr Lys Met Lys Gln Asn Asn Glu Asp Asp Tyr Leu Ser Asp	
640 645 650	

ggg atg aac agc cct gag ctg gct gct gct gac gag cca taagacctgg	2021
Gly Met Asn Ser Pro Glu Leu Ala Ala Ala Asp Glu Pro	
655 660	

ggcccaactg cctctccagc attggccttg gccttgatcc cagaagctag aggagctatt	2081
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tagatctccg gatttacatg cattaccctc atgttccttg aattctccca aaagcctctc	2141
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tgaccctggg tttttggcct aaacatccaa gattccgcct cggatcccg	2190
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<210> 24
 <211> 664
 <212> PRT
 <213> Homo sapiens

<400> 24

Met Thr Glu Lys Thr Asn Gly Val Lys Ser Ser Pro Ala Asn Asn His
1 5 10 15

Asn His His Ala Pro Pro Ala Ile Lys Ala Asn Gly Lys Asp Asp His
20 25 30

Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp Asp Asp Thr Ser Ser
35 40 45

Glu Leu Gln Arg Leu Ala Asp Val Asp Ala Pro Gln Gln Gly Arg Ser
50 55 60

Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile Ile Arg Glu Trp Ala
65 70 75 80

Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro Asp Ser Phe Leu Glu
85 90 95

Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Thr Gln Glu Gly Asp
100 105 110

Gly Lys Gly Asp Lys Asp Gly Glu Asp Lys Gly Thr Lys Lys Lys Phe
115 120 125

Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu Tyr Tyr Cys Trp Leu
130 135 140

Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys Leu Leu Val Ala
145 150 155 160

Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr Tyr Leu Val Trp Leu
165 170 175

Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile Ala Asp Leu Phe Ile
180 185 190

Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys Asp Thr
195 200 205

Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu Gln Phe Lys Leu Asp
210 215 220

Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe Ala Val Asp Ile
225 230 235 240

His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu His Phe Ala Arg Met
245 250 255

Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Asn Tyr Pro Asn Ile
 260 265 270

Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu Val Ile Ile His Trp
 275 280 285

Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser Ile Gly Phe Gly Val
 290 295 300

Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro Glu Tyr Gly Tyr Leu
 305 310 315 320

Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr Leu Thr Leu Thr
 325 330 335

Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp Glu Glu Tyr Leu Phe
 340 345 350

Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe Ala Thr Ile Val
 355 360 365

Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala Thr Arg Ala Glu
 370 375 380

Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr Met Gln Phe Arg Lys
 385 390 395 400

Val Ser Lys Gly Met Glu Ala Lys Val Ile Arg Trp Phe Asp Tyr Leu
 405 410 415

Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu Ile Leu Lys Asn Leu
 420 425 430

Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn Val His Leu Ser Thr
 435 440 445

Leu Lys Lys Val Arg Ile Phe His Asp Cys Glu Ala Gly Leu Leu Val
 450 455 460

Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser Pro Gly Asp Tyr
 465 470 475 480

Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr Ile Ile Lys Glu

485

490

495

Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr Gln Tyr Ala Leu
500 505 510

Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile Leu Asn Ile Lys
515 520 525

Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn Ile Arg Ser Leu Gly
530 535 540

Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu Met Glu Ala Val
545 550 555 560

Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu Arg Gly Arg Glu
565 570 575

Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala Thr Ser
580 585 590

Met Glu Val Asp Val Gln Glu Lys Leu Gly Gln Leu Glu Thr Asn Met
595 600 605

Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu Ala Glu Tyr Thr Gly
610 615 620

Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr Lys Met
625 630 635 640

Lys Gln Asn Asn Glu Asp Asp Tyr Leu Ser Asp Gly Met Asn Ser Pro
645 650 655

Glu Leu Ala Ala Ala Asp Glu Pro
660